

**REMARKS**

The final Office Action of November 1, 2005, has been received and reviewed.

Claims 1, 3-11, 13-29, 111, and 112 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

**Rejections under 35 U.S.C. § 112, First Paragraph**

Independent claim 1 has been rejected under 35 U.S.C. § 112, first paragraph, for reciting subject matter that purportedly has not been adequately described in the specification of the above-referenced application.

The originally-filed specification provides support for the recitation of porous regions that comprise “the same material as [a] substrate” at, for example, page 7, lines 16-18. Specifically, the originally-filed specification indicates that a substrate and porous capillary column may comprise the same material. More specifically, by way of example and not limitation, the originally-filed specification discloses that a substrate may be formed from silicon and that a porous capillary column therein may be formed from porous silicon or hemispherical grain silicon.

As the originally-filed specification provides an adequate written description of porous regions “comprising the same material as the substrate,” independent claim 1 complies with the written description requirement of the first paragraph of 35 U.S.C. § 112.

**Rejections under 35 U.S.C. § 102**

Each of claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 has been rejected under 35 U.S.C. § 102.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Northrup

Claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 stand rejected under 35 U.S.C. § 102(e) for being drawn to subject matter that is allegedly anticipated by the subject matter described in U.S. Patent 5,882,496 to Northrup et al. (hereinafter “Northrup”).

While Northrup discloses a relatively thick, nonplanar substrate that includes internally confined porous columns, Northrup lacks any express or inherent description of a sample separation apparatus that includes “at least one detector fabricated on [a] substrate in communication with at least one of . . . at least two porous regions” that extend at least partially across the substrate, as required by independent claim 1. Thus, Northrup does not anticipate each and every element of independent claim 1, as would be required to maintain the 35 U.S.C. § 102(e) rejection of independent claim 1.

Each of claims 3, 4, 7, 11, 18, 22-24, 111, and 112 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claim 7 is further allowable since Northrup lacks any express or inherent description of “a reaction region . . . situated along a length of and contiguous with at least one of . . . at least two porous regions.” While Northrup indicates that porous silicon may be used to provide increased surface area for chemical reaction chambers (col. 2, lines 11-18), Northrup says nothing about such chambers being situated along the length of or contiguous with at least one porous region that extends at least partially across a substrate. Thus, even though Northrup discloses chemical reaction chambers with porous silicon, that disclosure does not include identical detail to that required by claim 7, as would be required to maintain the 35 U.S.C. § 102(e) rejection of claim 7.

It is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 be withdrawn.

**Rejections under 35 U.S.C. § 103(a)**

Claims 1, 5, 7, 8, 10, 11, 14, 15, 21, 25-29, 111 and 112 stand rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Knoll in View of Northrup

Claims 1, 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in U.S. Patent 5,393,401 to Knoll (hereinafter “Knoll”), in view of teachings from Northrup.

As shown in FIG. 11 of Knoll, the teachings of Knoll relate to apparatus that include capillary channels 34 with branches that terminate at containments 2. *See also*, col. 8, lines 61-64. Each containment 2 has a transistor (more specifically, an ion-selective field-effect transistor (ISFET)) associated therewith. *See, e.g.*, FIGs. 4-6; col. 7, line 1, to col. 8, line 12. As shown, the containments 2 are small, discrete structures that are filled with porous material, such as a hydrogel, PVC solution, or the like. While Knoll teaches that the containments 2 may be filled with porous material, Knoll does not provide any teaching or suggestion that the channels 34 or any other features that extend across the substrate 1 thereof are filled with or otherwise comprise porous material. Thus, the transistors of Knoll communicate with discrete porous containments 2, not with a porous region that “extend[s] at least partially across the substrate [1].”

Northrup teaches structures that include porous elements that extend internally therethrough. As noted above, Northrup lacks any disclosure of a detector that communicates with any of the porous elements of the structures thereof.

Thus, neither Knoll nor Northrop, taken either together or separately, teaches or suggests a sample separation apparatus that includes “at least one detector fabricated on [a] substrate in communication with at least one of . . . at least two porous regions,” as would be required to render each and every element of independent claim 1 obvious under 35 U.S.C. § 103(a).

Claims 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Although the next two rejections have been characterized as anticipate rejections under 35 U.S.C. § 102, due to the Office’s reliance upon three or more references in each rejection, they instead appear to be obviousness rejections under 35 U.S.C. § 102. Accordingly, the failure of the cited art to either anticipate or render obvious each and every claim element will be addressed.

Heller, Vickers, and Northrup

Claims 1, 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 are rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 5,605,662 to Heller et al. (hereinafter “Heller”) in view of the disclosure of U.S. Patent 5,693,946 to Vickers et al. (hereinafter “Vickers”), and further in view of the subject matter described in Northrup.

As noted at pages 5 and 6 of the final Office Action (dated November 1, 2005), the teachings of Heller, like those of Knoll, are limited to apparatus that include a matrix of discrete “micro-locations.” Specifically, a device that includes an  $8 \times 8$  array of  $50 \mu\text{m}^2$  micro-locations was contemplated. FIG. 3; col. 12, lines 13-21. Although Heller discloses that optoelectronic or microelectronic detection elements may be associated with each of the discrete micro-locations of that device (*see* Office Action of November 1, 2005, page 6, *citing*, col. 20, lines 42-51), Heller does not teach or suggest that these detectors communicate with a porous region that “extend[s] at least partially across the substrate” in which the micro-locations have been fabricated.

Northrup teaches structures that include porous elements that extend internally therethrough. As noted above, Northrup lacks any disclosure of a detector that communicates with any of the porous elements of the structures thereof.

Vickers has been relied upon merely for its teaching that CCD detectors comprise FETs. Office Action of November 1, 2005, page 6.

In view of the foregoing, it is apparent that none of Heller, Vickers, or Northrup, taken either together or separately, teaches or suggests a sample separation apparatus that includes “at least one detector fabricated on [a] substrate in communication with at least one of . . . at least two porous regions,” as would be required to establish a *prima facie* case of obviousness against independent claim 1.

Each of claims 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

#### Burns in View of Northrup

Claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,379,929 to Burns et al. (hereinafter “Burns”) in view the disclosure of Northrup.

It is respectfully submitted that there are several reasons that teachings from Burns and Northrup do not support a *prima facie* case of obviousness against any of claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, or 112.

First, it is respectfully submitted that Burns teaches away from the subject matter recited in claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112. In this regard, independent claim 1 is directed to a sample separation apparatus that includes a substrate with matrices formed therein and at least one detector fabricated thereon. Burns emphasizes the desirability of apparatus that include two pieces that have been bonded together: a first piece with channels and other features for handling fluids and a second piece upon which electronic components, including sensors, are fabricated. Col. 21, line 24, to col. 22, line 13 (in particular, col. 21, lines 42-44). Burns notes that such two-piece structures are more desirable than single-piece structures, as they “give[] flexibility in choosing materials in wonw section of the unit without affecting other [parts] of that

same unit.” Col. 21, lines 32-35. Moreover, the teachings of Burns are limited to techniques in which two pieces must be used—a channels are formed in the surface of a first substrate, then sealed by bonding an electronic component-carrying second substrate to the first substrate. Col. 22, lines 15-41. Since Burns teaches away from a sample separation apparatus with matrices formed in and at least one detector fabricated on the same substrate, as recited in independent claim 1, it is respectfully submitted that, without the benefit of hindsight, one of ordinary skill in the art wouldn’t have been motivated to combine teachings from Burns with teachings from Northrup or any other reference in such a way as to render obvious the subject matter recited in independent claim 1 or any of claims 3-5, 7-9, 13, 16-20, 22-27, 111, or 112 depending directly or indirectly therefrom.

Second, Burns and Northrup do not, together or separately, teach or suggest each and every claim element. With respect to the subject matter recited in independent claim 1, neither Burns nor Northrup teaches or suggests at least one detector fabricated on the same substrate within which at least two matrices have been formed.

Therefore, under 35 U.S.C. § 103(a), the subject matter to which independent claim 1 is directed is allowable over the subject matter taught in Burns and Northrup.

Claims 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

**Burns, Northrup, and Dubrow**

Claim 21 has been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is assertedly unpatentable over the subject matter taught in Burns, in view of teachings from Northrup and, further, in view of the teachings of U.S. Patent 5,948,227 to Dubrow (hereinafter “Dubrow”).

Claim 21 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

**CONCLUSION**

It is respectfully submitted that each of claims 1, 3-11, 13-29, 111, and 112 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brick G. Power". The signature is fluid and cursive, with the first name "Brick" being more prominent.

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